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## C-A OPERATIONS PROCEDURES MANUAL

### 7.1.42 Cold Turbines “A” Train Initialization

Text Pages 2 through 5

#### Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: \_\_\_\_\_ *Signature on File* \_\_\_\_\_  
 Collider-Accelerator Department Chairman Date

S. Sakry

## 7.1.42 Cold Turbines “A” Train Initialization

### 1. Purpose

To provide instruction on preparing the turbines for start up, this includes the start up of the oil skids.

### 2. Responsibilities

- 2.1 The Shift Supervisor, or an Operator designated by the Shift Supervisor, is responsible for conducting the procedure and providing documentation in the Cryogenic Control Room Log.
- 2.2 Should a problem arise during the turbine initialization, the Shift Supervisor will report to the Technical Supervisor for instructions before continuing.

### 3. Prerequisites

- 3.1 Turbines have been regenerated.
- 3.2 Turbines have been purged per [C-A-OPM 7.1.27, “Expander Purge Procedure.”](#)
- 3.3 Seal gas compressor running per [C-A-OPM 7.1.23, “Seal Gas Compressor Startup.”](#)

### 4. Precautions

- 4.1 If there is liquid helium in the refrigerator pots, all personnel entering the refrigeration wing of Bldg. 1005R must be ODH Class 1 qualified, have a Personal Oxygen Monitor (POM), and carry an emergency escape pack.

### 5. Procedure

- \_\_\_\_\_ 5.1 Date\_\_\_\_\_.
- \_\_\_\_\_ 5.2 Ensure the turbine inlet valves H385A\_\_\_\_\_ and H402A\_\_\_\_\_ are closed.
- \_\_\_\_\_ 5.3 Ensure the turbine outlet valve H410A\_\_\_\_\_ is closed.
- \_\_\_\_\_ 5.4 Ensure the interstage valve H397M\_\_\_\_\_ is open.

**Note:**

**The procedure assumes that both turbine inlet filters are clean. If a filter is not clean, that filter shall remain isolated.**

- \_\_\_\_\_ 5.5 If placing inlet filter “A” online, complete the following:
- 5.5.1 Open outlet valve H9161M\_\_\_\_\_ and inlet valve H9158M\_\_\_\_\_.
- 5.5.2 Close “B” filter outlet valve H9152M\_\_\_\_\_ and open inlet valve H9150M\_\_\_\_\_ as a sign that “B” filter is ready for service.
- \_\_\_\_\_ 5.6 If placing “B” inlet filter online, complete the following:
- 5.6.1 Open outlet valve H9152M\_\_\_\_\_ and inlet valve H9150M\_\_\_\_\_.
- 5.6.2 Close “A” filter outlet valve H9161M\_\_\_\_\_ and open inlet valve H9158M\_\_\_\_\_ as a sign that “A” filter is ready for service.
- \_\_\_\_\_ 5.7 Unless otherwise instructed, do not adjust expander brake needle valves E897M and E901M. They are used for fine control of the turbine speed and are normally set to the correct position.
- \_\_\_\_\_ 5.8 Align turbine 5/6 oil sump to the seal gas compressor by opening valve H1241M.
- \_\_\_\_\_ 5.9 Align turbine 5A/6A drainer gas return by opening valves H1242M\_\_\_\_\_ and H1243M\_\_\_\_\_.
- \_\_\_\_\_ 5.10 Ensure the following isolation valves located near the turbine 5A/6A pod are open:
- |             |            |
|-------------|------------|
| E915M_____  | E916M_____ |
| E903M_____  | E896M_____ |
| H1246M_____ | E900M_____ |
| H1247M_____ | E909M_____ |
| H1250M_____ | E904M_____ |
- \_\_\_\_\_ 5.11 Ensure 120 VAC circuit breaker #7 in panel RP-2 (located next to CB3 and CB5 calorimeter local control panels) is closed.
- \_\_\_\_\_ 5.12 Remove mechanical brake assemblies from turbines 5A and 6A as per [C-A-OPM 7.1.26 “Expander Brake System Installation and Removal.”](#)
- \_\_\_\_\_ 5.13 Ensure the following 480 VAC circuit breakers (panel located on east wall of lower level) are closed:

Subsection E:

Breaker #2\_\_\_\_ Turbine Oil System #3, Pump #1

Breaker #3\_\_\_\_ Turbine Oil System #3, Pump #2

\_\_\_\_ 5.14 Open turbine oil skid 5/6 control air supply valve A203M\_\_\_\_ and adjust turbine 5A/6A air regulator PR9340A to 30 psig\_\_\_\_\_.

\_\_\_\_ 5.15 Ensure the following valves at turbine 5A/6A oil skid are closed:

E925M\_\_\_\_

E902M\_\_\_\_

E927M\_\_\_\_

E911M\_\_\_\_

E921M\_\_\_\_

\_\_\_\_ 5.16 Ensure the cooling water return valve W918M\_\_\_\_ and supply valve W903M\_\_\_\_ for turbine 5/6 oil skid are open.

\_\_\_\_ 5.17 Ensure the following valves located on turbine 5A/6A oil skid are open:

W973M\_\_\_\_

E931M\_\_\_\_

W971M\_\_\_\_

E924M\_\_\_\_

E996M\_\_\_\_

E922M\_\_\_\_

E997M\_\_\_\_

E905M\_\_\_\_

E998M\_\_\_\_

H10779M\_\_\_\_

E929M\_\_\_\_

\_\_\_\_ 5.18 Ensure the following vent valves for turbines 5A/6A are closed:

H9182M\_\_\_\_

H9190M\_\_\_\_

H9184M\*\_\_\_\_

H9192M\*\_\_\_\_

H395M\_\_\_\_

H412M\_\_\_\_

H695M\*\_\_\_\_

\*If found open, investigate and be suspect of air contamination.

\_\_\_\_ 5.19 On turbine 5A/6A oil skid, depress “Lamp Test” button to ensure all lamps work.

\_\_\_\_ 5.20 On turbine 5A/6A oil skid, start seal gas flow and oil pump as follows:

5.20.1 Depress “Annunciator Acknowledge” button\_\_\_\_\_.

5.20.2 Set seal gas pressure to approximately 200 psig by adjusting seal gas differential pressure regulator. Verify seal gas flow in flow meter\_\_\_\_\_.

5.20.3 Select primary oil pump by placing “Pump Select” switch to “No. 1” or “No. 2”\_\_\_\_\_.

**Caution:**  
**To prevent oil migration, do not send oil to the expander unless immediate expander startup is anticipated.**

**Note:**  
**If turbine train “B” is operating, it will be necessary to jog the switch in the following step to avoid starving “B” train of oil.**

5.20.4 Send oil to expander by placing “Lube Oil Selector” switch to “Unit 5A/6A” \_\_\_\_.

5.20.5 Verify all faults cleared and “Expander Ready” light is lit \_\_\_\_.

5.20.6 Ensure “Local/Computer switch is in “computer” \_\_\_\_.

**Caution:**

1. To prevent overspeed of turbines the system pressure must be less than 7 atm prior to turbine start up.
2. Following turbine start up, back wheel pressure must be greater than drainer pressure. This will prevent oil migration

## **6. Documentation**

- 6.1 The check off lines on the procedure are for the place keeping only. The procedure is not to be initialed or signed, it is not a record.
- 6.2 The Shift Supervisor shall document the completion of the procedure in the Cryogenics Control Room Log.

## **7. References**

- 7.1 [C-A-OPM 7.1.23, “Seal Gas Compressor Startup”.](#)
- 7.2 [C-A-OPM 7.1.26, “Expander Brake System Installation and Removal”.](#)
- 7.3 Drawing 3A995009, 25KW Helium Refrigerator P&ID.
- 7.4 Drawing 3A995705, Cold Expanders 5 and 6 System Schematic.

## **8. Attachments**

None